

JOINT TRANSPORTATION RESEARCH PROGRAM

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Best Practices for INDOT-Funded Work Zone Police Patrols

Introduction

Transportation agencies across the United States are expending a great deal of effort to improve highway work zone safety. Among those efforts is a special fund for work zone enforcement established by the Indiana Department of Transportation (INDOT). The allocation of enforcement funding was based on expert knowledge and weights and scores applied to work zone characteristics considered relevant to traffic safety. The objective of the reported project was to develop a rational and defensible tool for programming police enforcement that maximizes the safety benefits of police enforcement in INDOT work zones.

To understand what affects work zone safety, the research team carried out an extensive literature review, designed field experiments to evaluate the effect of selected enforcement strategies on drivers' behavior in work zones, and developed speed models incorporating the effect of police enforcement. The estimated speeds were used to derive Crash Modification Factors that express the effect of the police enforcement strategy on work zone safety. Finally, the research team combined all of the developed components to create a method of predicting the costs and the safety benefits in work zones under various enforcement strategies. This method was included in the optimization tool for programming police enforcement in a group of planned work zones.

Findings

The results of the literature study can be summarized as follows:

- The crash rates and severity tend to be considerably higher during a construction period than before that period.

- Lane closure, crossover, high construction intensity and driver behavior tend to increase the crash rate.
- Only a few work zone crash models included both a reasonably large sample size and detailed work zone features.

The INDOT project engineers' survey resulted in a dataset for 72 work zones represented by detailed cross-section geometry and traffic management information. The collected data were used to estimate the safety performance model for work zones.

A carefully designed field experiment evaluated several police enforcement strategies. All of the police enforcement strategies and, particularly, the VMS were identified as effective methods of speed reduction. Crash Modification Factors were developed for different enforcement strategies based on the speed reduction estimates.

The challenge of maximizing the safety benefits of the work zone police enforcement under the resources constraints, including the annual budget, the number of police patrol cars available simultaneously, and the number of the VMS units available simultaneously, was formulated as an integer linear programming problem. The solution yields, on a monthly basis, the work zones to be enforced, the police enforcement strategy, and the use of VMS units.

Implementation

The described project resulted in a research report that explains the basis for the optimization tool, which is implemented in a Microsoft Excel spreadsheet with the OpenSolver add-in. The tool is flexible, straightforward, and easy to use. The user should be able to quickly become familiar with the required input, results, and obtained solution.

Recommended Citation

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